

That is, in an air treating process, scrubbers 107 strip all the odor causing compounds out of the air before emitting it to the atmosphere. The raw feed system 110 segregates the wet and dry raw material or litter and feeds the raw material or litter to the dryer system 115. The dryer system 115 heats and pasteurizes the raw material so as to remove and destroy bacteria. The dryer system 115 includes grinders 117 that reduce the dried material to a powder before it is transferred to the pelleting and screening system 120. Moisture captured in the air treating process may be re-used in the pelleting and screening system 120 to balance moisture content. The pelleting and screening system 120 produces pellets comprising primarily of organic matter and humus as further described herein. It is preferable that the pelleting and screening system 120 includes two pellet mills 122, each operating at 500-horsepower and capable of producing 10 tons of pellets per hour. The pellets are approximately 1 - 6.5 mm long. The pellets are very useful for commercial row crop operations that are suffering from micronutrient deficiencies or low organic matter. The finished pellets are cooled and stored in a finished product room, which is regulated by the finish area ventilation system 125. The finish area ventilation system 125 is similar to the raw area ventilation system 105. The finished product can then be loaded into trucks or rail cars for bulk shipment to nutrient deficient regions.

FIG. 2 is a flow diagram illustrating a poultry litter fertilizer manufacturing process in accordance with an exemplary embodiment of the invention. Poultry producers often have surplus litter from their farms. A first step in the process is to remove the surplus litter from the farms in step 202. Next, the surplus litter is transported to another plant or site where it can be processed to micronutrients in

step 204. The surplus litter, for example, may be loaded into specially designed, covered and leak-proof aluminum trailers dedicated for transport to a pellet processing plant. At 206, the litter trucks are unloaded in a raw material room of the pellet processing plant, where a negative air system changes several times an hour, e.g., 10 times per hour, so as to prevent dust and odor from escaping to the outside environment. The wet and dry litter is segregated into designated feed hoppers at 208 with a front-end loader before moving to a dryer.

The negative air system is an air-filtration system that ensures that no odor or dust is emitted into the environment. In particular, thermal energy is used to break down the chemical properties of odor-causing compounds. The air-filtration system is preferably 99.9 percent efficient in eliminating odor.

The negative air system includes scrubbers for removing odor from the air. The treated air contains moisture, which is captured and re-used in the pelleting process as further described herein. At 210, the litter is pasteurized in a dryer to destroy bacteria. The litter should be heated to about 180° F to 225° F. Next, at 212, the dried litter is reduced to a consistency of fine sand by, e.g., a hammer mill. The reduced dried litter is then transported to a pellet mill at 214, which produces pellets comprising primarily of organic matter and humus.

The pellets produced by the pellet mills are hot, typically 200° F, and need to be cooled to within about five degrees (F) of ambient temperature as shown at 216 so as to ensure product quality. At 218, the cooled pellets are transported to a finished product room via a system of conveyors and elevators. The finished product room operates on a similar negative air system used in the raw material room. The finished product room (of the pellet plant) can store 7,000 tons of

pellets. The pellets are loaded with a front-end loader onto an in-ground conveyor and transported to waiting rail cars and trucks. The finished product is tested on a regular basis (e.g., weekly) by an in-house and/or an outside agency for quality control. Each pellet plant is capable of loading 30 rail cars in 24 hours or the equivalent of about 350 tons per hour. The finished product is shipped to nutrient deficient regions internationally.

The invention offers poultry producers an environmentally sound solution for managing surplus poultry litter. The invention recycles both valuable nutrients and organic material without creating any waste byproducts. The final product of the invention--pasteurized, all-natural fertilizer pellets called MicroStart60® (MicroStart60® is a registered trademark for a fertilizer of Perdue-AgriRecycle LLC)--can be easily shipped from poultry-producing areas to nutrient-deficient regions across the country and around the globe. In particular, MicroStart60® is a fertilizer comprising a wide variety of micronutrients, humus and organic matter that help produce significant increases in normal crop yields year after year. MicroStart60® is ideal for commercial row crop farming, i.e., MicroStart60® is especially formulated for precision agriculture so as to increase crop yield and health. MicroStart60® helps crops take up more nutrients while adding humus, organic matter and essential trace elements back into the soil and, thus, it improves vital water retention. MicroStart60® also includes proper amounts of Nitrogen (N), Phosphate (P<sub>2</sub>O<sub>5</sub>), Potassium (K<sub>2</sub>O), and other important secondary nutrients and trace elements that are vital to healthy plant growth. By incorporating MicroStart60® into a current fertilizer program, one can expect to maximize the soil's nutrient content as well as its nutrient availability. In other words,